

NON-PUBLIC?: N
ACCESSION #: 9110170118
LICENSEE EVENT REPORT (LER)

FACILITY NAME: NORTH ANNA POWER STATION UNIT 1 PAGE: 1 OF 04

DOCKET NUMBER: 05000338

TITLE: SPURIOUS CLOSURE OF "A" MAIN STEAM TRIP VALVE CAUSING
REACTOR

TRIP AND SAFETY INJECTION

EVENT DATE: 08/08/91 LER #: 91-017-01 REPORT DATE: 10/10/91

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: G. E. Kane, Station Manager TELEPHONE: (703) 894-2101

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On August 8, 1991, at 0242 hours, with Unit 1 at 99.8 percent power (mode 1) "A" main steam trip valve shut causing a safety injection and reactor trip. The initiating signal for the safety injection was high steam flow coincident with low steam line pressure in two out of three main steam lines. At 0250 hours a Notification of Unusual Event was declared, and the safety injection signal was reset in accordance with Emergency Procedures. Heat removal was accomplished through the atmospheric main steam power operated relief valves due to closure of the main steam trip valves. This event is reportable pursuant to 10CFR50.73 (a)(2)(iv), and was the twelfth ECCS Actuation reportable pursuant to Technical Specification 6.9.2. A one hour report was made pursuant to 10CFR50.72 (a)(i).

The cause of the event was water entering the control relay junction box

for the "A" main steam trip valve. The source of water was determined to be rainfall entering the quench spray pump house due to a defective rain gutter. Inspection of the junction box revealed corrosion on the relay contacts which closed the gap between the seal-in contacts making it possible for water to create a short across the contacts.

No significant safety consequences resulted from this event because all safety systems responded appropriately. Therefore, the health and safety of the public was not affected at any time during this event.

END OF ABSTRACT

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1.0 Description of the Event

On August 8, 1991, at 0242 hours, with unit 1 at 99.8 percent power (mode 1) "A" main steam trip valve (EIS System Identifier SB, Component identifier ISV) shut causing a safety injection and reactor trip. The initiating signal for the safety injection was high steam flow coincident with low steam line pressure in two out of three main steam lines. A main steam line isolation signal was also generated during the event which closed the remaining main steam trip valves. Heat removal was accomplished through the atmospheric main steam power operated relief valves (Component Identifier RV) due to closure of the main steam trip valves. At 0250 hours a Notification of Unusual Event was declared, and the safety injection signal was reset in accordance with Emergency Procedures. This event is reportable pursuant to 10CFR50.73 (a) (2) (iv), and was the twelfth ECCS Actuation reportable pursuant to Technical Specification 6.9.2. A one hour report was made pursuant to 10CFR50.72 (a) (i) due to the declaration of an emergency class specified in the approved Emergency Plan.

An investigation was conducted to determine the failure mechanisms for the inadvertent closure of the "A" main steam trip valve. The Train "A" and "B" control relays and the air cylinder solenoid operated valves (SOVs) were inspected for the "A" trip valve. The SOVs all appeared to be in satisfactory condition and in the vented state.

The Train "B" control relay (Component Identifier RLY) was inspected and was found to have standing water in the bottom of its junction box. (Note: Prior to the event the station was experiencing a heavy rain storm.) In addition, the relay contacts were found corroded. There was evidence that water had dripped onto the relay contact block from around the conduit where it penetrates the junction box. The corrosion on the contacts closed the gap between the seal-in contacts making it possible

for water to create a short across the contacts.

When the seal-in contacts shorted, the relay and the Train "B" SOV were both energized. The Train "B" SOV, when energized, vented the air cylinders on the "A" main steam trip valve allowing the disc to fall into the steam flow path and the valve went shut. The SI signal was subsequently generated when the "B" and "C" main steam line flows increased to offset the loss of flow from "A" steam generator.

2.0 Significant Safety Consequences and Implications

No significant safety consequences resulted from this event because all safety systems responded appropriately. All Operations Department responses were prompt and in accordance with approved station procedures. Therefore, the health and safety of the public was not affected at any time during this event.

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3.0 Cause of the Event

The root cause for the relay failure and unit trip is water entering the control relay junction box. The source of water was determined to be rainfall entering the quench spray pump house because of a defective rain gutter. Water accumulated in the gutter, eventually leaking out a crack onto the ventilation duct on the side of the quench spray pump house.

The water ran down the inside wall of the building and collected on the floor at ground elevation. It then dripped through an 8" open floor penetration that services an auxiliary steam line. The water dripped through the penetration onto a support above the Train "B" control relay box. The water settled on the top of the junction box and seeped through the conduit connection on the top of the box. After entering the box, the water dripped directly onto the relay contacts.

4.0 Immediate Corrective Actions

The Emergency Procedures were entered, and it was determined that "A" MSTV had closed. A Notification of Unusual event was declared at 0250 hours due to a non-spurious actuation of the ECCS.

5.0 Additional Corrective Actions

The junction boxes for all of the control relays on both units were inspected. Standing water was found on an additional junction box from humidity condensing on quench spray lines above the box. The relay was

inspected, and there was no evidence of leakage into the junction box.

The rupture discs on the "A" MSTV were replaced, and the three MSTVs were returned to the open position. Each MSTV was functionally tested to verify no mechanical damage had occurred.

5.0 Additional Corrective Actions (continued)

The defective gutter was properly sealed, and its slope to the downspout was corrected.

A ring of caulking material was built up around the B" open penetration in the floor of the quench spray pump house to keep water from running down to the basement.

Unit 2 was also inspected for similar conditions.

6.0 Actions to Prevent Recurrence

The ventilation duct on the QSPH wall will be sealed at the filter housing both inside and outside the duct as applicable.

The 8" floor penetration serving the auxiliary steam line in the QSPH will be sealed.

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The conduit entrance point for all control relay cabinets in the QSPH basement will be sealed.

7.0 Similar Events

LER N1-86-006-00 documents a reactor trip from mode 1 and 100 percent power due to closure of the "B" main steam line trip valve. The cause of the valve failure was attributed to prior damage to the air cylinder rupture discs.

8.0 Additional Information

North Anna Unit 2 was in mode 1 at 100% power throughout this event and was not affected.

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Vepco
VIRGINIA ELECTRIC AND POWER COMPANY

NORTH ANNA POWER STATION
P.O. BOX 402
MINERAL, VIRGINIA 23117

10 CFR 50.73

October 10, 1991

U. S. Nuclear Regulatory Commission Serial No. N-91-027
Attention: Document Control Desk NAPS: WCH
Washington, D.C. 20555 Docket No. 50-338
License No. NPF-4

Dear Sirs:

The Virginia Electric and Power Company hereby submits the following
Licensee Event Report Revision applicable to North Anna Unit 1.

Report No. 91-017-01

This Report has been reviewed by the Station Nuclear Safety and Operating
Committee and will be forwarded to the Corporate Management Safety Review
Committee for its review.

Very Truly Yours,

G. E. Kane
Station Manager

Enclosure:

cc: U.S. Nuclear Regulatory Commission
101 Marietta Street, N.W.
Suite 2900
Atlanta, Georgia 30323

Mr. M. S. Lesser
NRC Senior Resident Inspector
North Anna Power Station

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